Conflict and Health

REVIEW

Open Access

Navigating challenges, solutions and requirements in the provision of trauma care in conflict settings by humanitarian actors: a scoping literature review

Nikolaos Markou-Pappas[1,2*], Luca Ragazzoni[1,3], Claudia Truppa[1,4], Flavio Salio[1,5], Francesco Barone-Adesi[1,2] and Hamdi Lamine[1,6]

Abstract

Background The evolving nature of irregular warfare and the increasingly frequent violations of human rights law and international humanitarian law pose unique challenges for humanitarian actors delivering trauma care in conflict settings.

Methods A scoping review was conducted on PubMed, Scopus, and Web of Science and a web search (on Google, Google scholar and Bing) to analyze and review past humanitarian interventions offering trauma care in conflict settings. Relevant records were identified from scientific and grey literature. The thematic areas identified by the framework for a Public Health Emergency Operations Centre were used to facilitate the synthesis and analysis.

Results Eleven records examining all phases of conflict identifying gaps throughout the continuum of care in the trauma systems were included. Challenges, solutions and requirements in transportation capacity, data collection methodologies, field coordination mechanisms, and rehabilitative care services were highlighted. Addressing the shortages in skilled healthcare workers, implementing quality improvement measures, and developing standardized training curricula were some of the requirements reported.

Conclusions Our findings suggest that a multidimensional approach emphasizing strong coordination, with inclusive partnerships, is fundamental for effective trauma care systems in conflict zones. Key recommendations include robust medical transport, comprehensive healthcare training, preemptive mass casualty planning, standardized educational materials, continuous context reassessment, data protection, and improved transparency. These strategies could enhance trauma care interventions, ensuring they are effective, equitable, accountable, and sustainable.

Keywords Trauma care, Trauma system, Humanitarian, Conflict

*Correspondence:
Nikolaos Markou-Pappas
nikolaos.markoupappas@uniupo.it
Full list of author information is available at the end of the article

Introduction

Trauma is a major global health issue, with approximately 5 million deaths annually worldwide [1]. In conflict settings, the burden is particularly severe, with over 90% of injury-related deaths occurring in low- and middle-income countries, and conflict-affected populations experiencing higher rates of mental disorders such as depression, anxiety, and post-traumatic stress disorder [1–3].

Conflict inflicts injury, displacement, and death. It disrupts vital healthcare services, hampers medical supplies, and dismantles healthcare systems, hindering prompt and effective healthcare interventions leaving populations vulnerable to a myriad of challenges· [4, 5].

One of the most critical healthcare interventions is the implementation of a trauma system; encompassing a coordinated network of medical resources and personnel dedicated to supporting injured individuals. This system integrates emergency care, specialized trauma centers, rehabilitation services, and a well-defined referral pathway, complemented by mental health and social work support. This comprehensive approach not only addresses immediate injuries but also helps prevent long-term physical and psychological consequences [6].

Significant advancements in the implementation of trauma care systems have largely emerged from the military sector [7], which, as a warring party, has historically borne the responsibility for delivering such care [8]. However, due to the blurring of traditional distinctions between combatants and civilians and an increasing disregard for international humanitarian law (IHL) the burden of care falls to the shoulders of the humanitarian and civil society organizations [9, 10]. In the face of this ongoing need to "push" these actors ever closer to the frontline, revising the methods for providing trauma care to the affected people becomes necessary.

Despite the critical role humanitarian actors play in providing trauma care during conflicts, there remains a limited synthesis of insights tailored specifically to these unique settings. This knowledge gap underscores the need to consolidate existing evidence on challenges, solutions, and requirements for effective trauma care in conflict zones, ensuring that future interventions are both context-sensitive and grounded in practical experience. To address such need in an evidence-based fashion, we conducted a scoping review of both scientific and grey literature to map out the challenges humanitarian actors face while providing trauma care within conflict zones, explore the solutions that have been proposed or implemented in past conflicts and document any requirements for effective interventions.

Methods

Search strategy and selection criteria

This review was conducted according to the methodological approach of Peters et al. [11] and relying on the PRISMA-ScR checklist [12] (Supplementary Material 1). On August 21st, 2023, we searched on PubMed, Scopus, and Web of Science combining 3 different sets of terms, namely "trauma care", "conflict", and "humanitarian" (Supplementary Material 2). To look for additional literature (grey literature, books, chapters etc.) a web search (on Google, Google scholar and Bing) was performed the same day. No restrictions or filters were applied. Peer-reviewed records identified from databases were uploaded to Rayyan Intelligent Systematic Review tool [13]. After automatic removal of duplicates, titles and abstracts of the remaining articles were manually screened independently by two reviewers (NMP, HL) and those not complying with the inclusion criteria were excluded. NMP and HL reviewed independently all retrievable full-text articles eligible for inclusion. Discrepancies on inclusion decisions were resolved upon discussion at the end of each phase. The corresponding authors of inaccessible articles were contacted through email. The references of the selected articles were also screened to identify any other relevant study to be included. Non-peer-reviewed records identified from search engines, were manually screened independently by the two reviewers and those not complying with the inclusion criteria were disregarded. All final included records were organized into an excel sheet for the data extraction process. A second check of the same databases was performed on December 11th, 2023. No further searches were conducted thereafter.

To be included, a record had to be an original peer-reviewed study or a non-peer-reviewed record (such as reports, guidelines, books, commentaries) written in English and either: (a) discussing the implementation of trauma care for civilians by humanitarian actors in a conflict setting; or (b) focusing on lessons learned from civil-military cooperation in conflicts. Exclusion criteria were: (a) records reporting trauma care offered in military-led humanitarian missions; (b) records focusing only on medical protocols, treatment options, and/or therapeutic options.

Data analysis

The data analysis aimed to answer the research question of what the challenges humanitarian actors face are while providing trauma care within conflict zones and the solutions that have been proposed or implemented in past conflicts. The collected data encompassed the records' main characteristics, details about the conflict (year, location), the period covered (pre, during, or post

conflict) and the themes discussed (pre-hospital, hospital, rehabilitation, logistics). Peer reviewed papers were critically appraised following the 'Quality assessment with diverse studies (QuADS)' tool by Harrison et al. [14] (Supplementary Material 3). Such appraisal served as additional data generated but not as an inclusion or exclusion criterion.

Following Thompson's guidelines [15], an abductive thematic analysis was independently performed by the two reviewers (NMP and HL). The analysis was supported by the overlapping thematic areas identified by the World Health Organization's (WHO) Framework for a Public Health Emergency Operations Centre (PHEOC) Incident Management System model which provides countries with key-concepts and evidence-based guidance for designing, developing, and strengthening their PHEOC's operations [16]. This framework would ensure alignment with international standards and enhance comparability and transferability across contexts. The management function includes executive decision-making and risk communication. The planning section evaluates situations, analyzes data, and tracks resources. Operations support tactical resource use, while logistics handles resource acquisition and deployment. The financial and administrative section manages expenditures and administrative tasks (Fig. 1). A discussion followed to resolve any discrepancies. The final analysis was consolidated and synthesized by the first author [16].

Results

A total of 1088 records ranging from 1975 up until 2023 were identified, out of which six original research studies and five publications were included after going through different screenings (Fig. 2). Based on the performed QUADS assessment the overall quality of the included records, ranged from low to high. For analysis, records were classified based on areas of trauma care system examined.

Out of the 11 included records, three were books offering trauma care guidelines [17–19], two were case studies [20, 21] and the rest were scientific articles drawing on diverse experiences of humanitarian emergency responses in conflicts. Of the included records, five focused on Middle Eastern settings [20–24], one on Afghanistan [25], while the rest were of global remittance. Nine records focused on active conflict [17, 19–24, 26, 27], one on the post-conflict period [25], and one was not specific to any phase [18] (Table 1).

Management

Seven records highlighted the absence of a unified vision among health authorities as a critical shortcoming in the provision of trauma care in conflict settings [25]. The lack of a command-and-control structure over medical assets [19, 23, 27], along with gaps in interagency strategic planning and coordination [25], seemed to exacerbate inefficiencies in the responses. Additional challenges reported were the delayed establishment of coordination mechanisms [20, 22]; the unclear roles for healthcare professionals and inappropriate assignment of trauma related tasks [25]; the gaps in quality improvement interventions [17, 27]; and the inadequate equipment and resources [18, 22].

Management, according to four records, benefits significantly from increased funding, and technical support from organizations like the WHO [20, 23, 24], staffing through private medical providers [23], and adoption of a direct in-country implementation with remote coordination across borders [22]. Additionally, regular coordination meetings [21, 24, 27], negotiations with local authorities [22], including the Ministry of Health [18, 21], were helpful in establishing a trauma care system for patients requiring protection.

The requirements on management proposed by four records included designating a lead national agency [18], establishing a chain of command [19, 20, 27], and appointing a local medical director [18]. Investment in the development and coordination of national and local

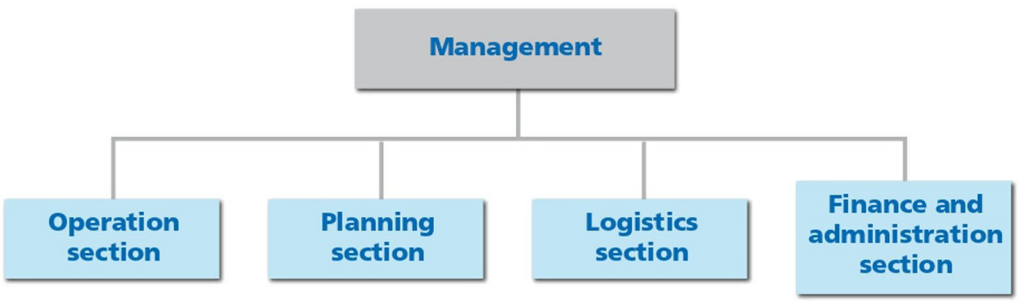
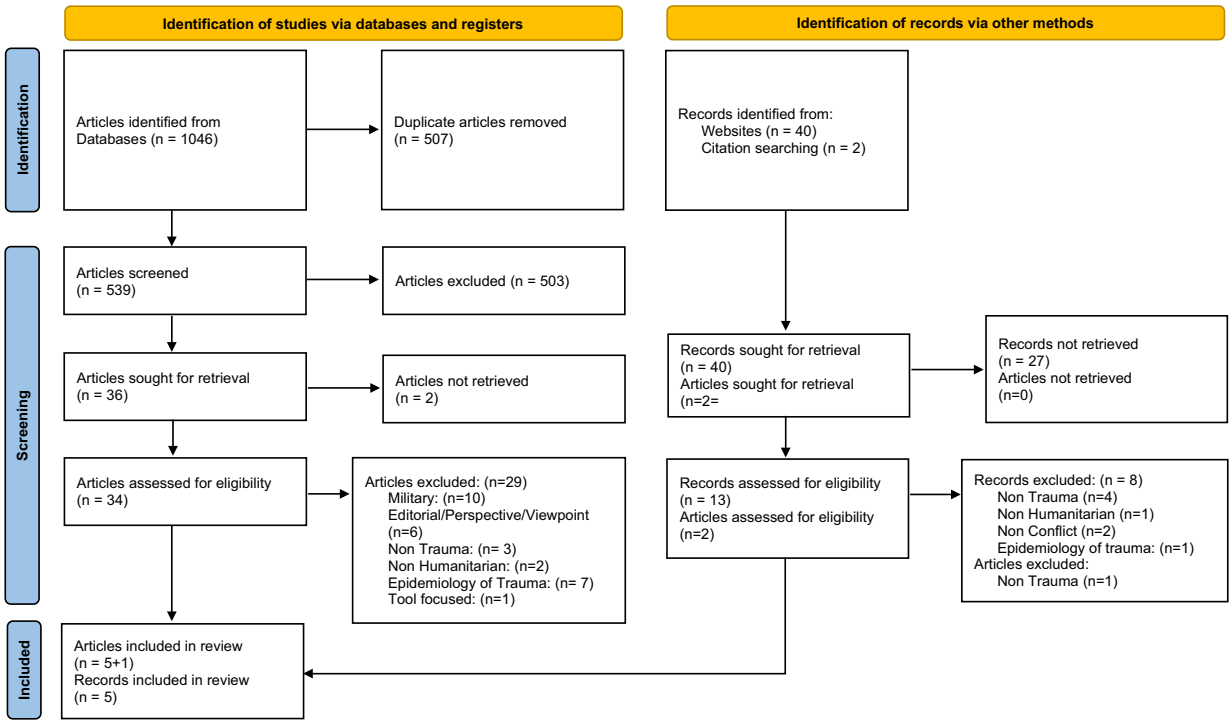


Fig. 1 Incident Management System model (From: Framework for a Public Health Emergency Operations Centre. WHO, 2015.)



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: http://www.prisma-statement.org/

Fig. 2 PRISMA diagram

structures [18, 21, 22], putting special focus on the pre-hospital setting [18], along with the establishment of a trauma working group with dedicated task forces [25], were described as essential requirements for sustainable trauma care. Moreover, efforts to build upon existing infrastructure were underscored, with initiatives focusing on the rehabilitation of primary and secondary healthcare facilities [22]. Most of those records identified the intentional transition of emergency field hospitals to government control post-conflict as a strategic move [20, 23], ensuring sustainability and extending services to the broader community during and beyond immediate conflict periods [20].

Operations

The records analyzed revealed significant operational challenges. Firstly, a fragmented referral system [24] with lack of medical direction from a dispatch center [21, 25] and under-resourced field coordination often relying on a single individual for decisions regarding patients' referral [20, 24], were reported to impede rapid evacuation [20] and appropriate trauma care. Furthermore, en-route care faced constraints stemming from an absence of policies ensuring adequate and standard equipment in ambulances [27], resulting in a shortage of ambulances [18, 24, 25] often lacking essential medical supplies [20, 23, 24], operating without medical personnel [24], or with limited medical training [17, 20] who often directed injured patients to the closest hospitals without considering service-to-injury suitability [18, 23, 24]. The commandeering of ambulances by military forces significantly hindered the pre-hospital care system [20, 24].

Communication gaps such as the absence of a universal access number [20, 25], low network coverage in rural areas [25], inconsistent mobile or radio contact with ambulance drivers [18, 23], and low compliance with pre-arrival notification systems between ambulance crews and receiving hospitals [17, 25], challenged access to timely care. Additionally, continuum of care was threatened by a combination of factors, including brain drain of skilled healthcare providers [22], shortage of dedicated emergency physicians and nurses [19–21] and a gap in rehabilitation [20, 24]. Two records highlighted the inadequacy of training for the health workers [20, 24] involved in trauma care and three records underscored the lack of preparedness' assessments among emergency medical organizations and their personnel [18, 22, 25]. The absence of clear protocols for triaging acutely injured patients [20, 21, 25] and inconsistent trauma

Table 1 Summary characteristics of records included

Record	Summary	Setting	Pre-Conflict	Conflict	Post-conflict	Pre-hospital	Hospital	Post-hospital	Operations support
Quinn V JM, Amouri OF, Reed P. Notes from a field hospital south of Mosul. Global Health 2018; 14: 27	The article discusses the challenges and importance of accountable disaster response in conflict zones, focusing on the situation in Iraq, particularly in Mosul. It emphasizes the need for support in health system capacity building, trauma services, and disease prevention, highlighting the high casualty rates during the liberation of Mosul	Mosul, Iraq		X		X	X		X
Wren SM, Wild HB, Gurney J, et al. A Consensus Framework for the Humanitarian Surgical Response to Armed Conflict in 21st Century Warfare. JAMA Surg 2020; 155: 114–21	The article presents a consensus framework for the humanitarian surgical response to 21st-century warfare, focusing on the importance of trauma systems in conflict zones to reduce preventable death and disability	NA		X		X	X	X	X
Akik C, Semaan A, Shaker-Berbari L, et al. Responding to health needs of women, children and adolescents within Syria during conflict: intervention coverage, challenges and adaptations. Confl Health 2020; 14: 37	The article explores the challenges and adaptations in delivering reproductive, maternal, newborn, child, and adolescent health and nutrition interventions in Syria during the conflict. It discusses the impact of data gaps, funding restrictions, coordination challenges, and security situations on the provision of healthcare services	Syria		X			X		X
Garber K, Kushner AL, Wren SM, Wise PH, Spiegel PB. Applying trauma systems concepts to humanitarian battlefield care: a qualitative analysis of the Mosul trauma pathway. Confl Health 2020; 14: 5	The article explores the adaptation of military trauma system concepts in the civilian trauma response during the Battle of Mosul. The study discusses the implementation of a trauma pathway for civilians, coordinated by the World Health Organization, which involved multiple organizations providing care at different levels	Mosul, Iraq		X		X	X	X	X
Khudadad U, Aftab W, Ali A, Khan NU, Razzak J, Siddiqi S. Perception of the healthcare professionals towards the current trauma and emergency care system in Kabul, Afghanistan: a mixed method study. BMC Health Serv Res 2020; 20: 991	The article focused on assessing the perceptions of healthcare providers, hospital managers, and policy makers in Kabul, Afghanistan regarding the trauma and emergency care system	Kabul, Afghanistan			X	X	X		X

Table 1 (continued)

Record	Summary	Setting	Pre-Conflict	Conflict	Post-conflict	Pre-hospital	Hospital	Post-hospital	Operations support
Salio F, Pirisi A, Ciottone GR, et al. Applying the Haddon Matrix to Frontline Care Preparedness and Response in Asymmetric Warfare. Prehosp Disaster Med 2022; 37: 577–83	The article presents a new framework utilizing the Haddon Matrix to enhance frontline care preparedness and response in asymmetric warfare, focusing on Trauma Stabilization Points (TSPs). By convening an expert group to develop and validate the content of the Haddon Matrix, key strategies for TSP preparedness and operational readiness were identified	NA	X	X	X	X			X
Mock C, Lormand JD, Goosen J, Joshipura M, Peden M. Guidelines for essential trauma care. World Health Organization, 2004	The guidelines set forth a list of essential trauma services that can be achievable in virtually every setting worldwide, and then lays out the various human and physical resources that are needed to assure that such services are provided	NA		X		X	X		X
Sasser S, Varghese M, Kellermann A, Lormand J. Prehospital Trauma Care Systems. World Health Organization, 2005	The record identifies the core strategies, equipment, supplies and organizational structures needed to create effective and adaptable prehospital care systems for injured persons worldwide	NA				X			
Spiegel P, Wise P, Kushner AL, Garber K. The Mosul Trauma Response A Case Study. 2018	The record is an independent case study of the trauma referral pathway implemented by the WHO to respond to the gaps in trauma care in Mosul. It focuses on four key areas: (1) the decision-making process; (2) humanitarian principles; (3) the effectiveness of the response; and (4) lessons learned and recommendations	Mosul, Iraq	X	X	X	X	X	X	X
Giannou C, Baldan M. War Surgery—Working With Limited Resources In Armed Conflict And Other Situations Of Violence, Second. International Committee of the Red Cross, 2019	The record covers diverse topics relevant to surgeons and coordinators of surgical programs during conflict and violence. It emphasizes epidemiology, organization, logistics, and surgical care in war zones	NA		X		X	X	X	X
WHO. 'A One-Year Review of Trauma Data and the Humanitarian Consequences'. 2019	The record analyses the Emergency Trauma Response to the Gaza Mass Demonstrations 2018–2019G, demonstrating that a collective response, with adapted and localized solutions can provide many people with timely, life-saving care	Occupied Palestinian territory	X	X	X	X	X	X	X

care guidelines [17, 21, 25] during mass casualty events [20, 21], and the over-reliance on untrained bystanders for timely delivery of care in the pre-hospital setting [18, 25] represented systemic deficiencies. Lastly, the report of inappropriate surgical interventions [17, 21], and a lack of accountability for the quality of care provided throughout the system [25], reflected the overall struggle to save lives and limbs.

One of the key solutions to address the challenges of patient transfer in safe and timely manner was establishing a centralized dispatch center [21, 25, 27]. Involving the local community in identifying the best locally available means of transportation was of paramount importance in aligning the system with the specific needs and resources of the region [18, 22]. Defining evacuation policies prioritizing severe injuries to the most suitable hospital [26, 27]. and transfer criteria [17, 20, 21, 24, 27] between hospitals through beforehand agreements and protocols built upon such critical objective [17]. The relationship between hospitals was characterized as pivotal for the establishment of functioning referral pathways [17, 19] relying on viable ambulance networks with qualified care providers [18], ensuring the provision of en-route care for the patients being transferred throughout the referral system [24, 27]. To achieve this higher clinical governance and better overall coordination [25], implementing a communication system emerged as a critical aspect. Two records encouraged the utilization of any locally available options such as radio, and social media, enhancing community awareness [24, 26]. The record putting forward a framework for the humanitarian surgical response to these austere environments, suggested the introduction of two approaches: the contingency facilities for damage control surgery en-route to definitive care facilities [26], addressing the need for specialized care in specific situations [17], and the advanced capability package [26], aiming to equip definitive care facilities with specialized surgical personnel and advanced equipment, coupled with efforts in reconstructive surgery and rehabilitation [20, 21].

Developing a national triage protocol [20], implementing airway and hemorrhage control interventions [21, 25], emphasizing proper wound and burn care [18, 21, 23], establishing clear criteria for amputation [21], and upgrading rehabilitation at primary healthcare centers [18, 21, 22] were identified as some of the technical expertise required. Furthermore, standardized technical and contextual training for personnel deployed to conflict settings were emphasized as a solution for increasing preparedness and uniformity in response efforts [20–22, 26, 27]. Essential components of this training, that could be performed with pre-deployment checklists and standardized educational material [26], include humanitarian ethics [26] and IHL [20] as well as awareness of the local sociocultural and political landscape [26]. According to some records, first responders should receive training in safe recovery of the wounded, proper use of personal protection equipment, risk reduction strategies, and contingency planning [18, 22, 26]. Recognizing the long-term needs of trauma survivors, investing in basic care training of non-medical civilians [18, 25–27] serve as crucial requirements for reconstruction, and rehabilitation [21], fostering community resilience and self-reliance [27].

Planning

The capture of operation-related data was revealed by seven records to be one of the most persistent challenges while providing medical care for civilians in conflict settings. The overall collection process was burdened by incomplete data [20, 23, 26], irrelevant categories [24], manual completion [21] occasionally performed with paper data sheets [20, 26]. The absence of a systematic patient tracking system [21, 24], the variability observed among organizations in the patient records management [20, 21, 24, 27], especially for post-operative rehabilitation [20], the lack of discharge plans [20, 21], and the absence of data on transport times or appropriateness and quality of interventions [20, 24], and the general inability to identify, track and address the specific needs and vulnerabilities of women and children [22], were some of the challenges pointed out in five of the records included in this review.

Four records encouraged a rapid initial assessment of the context before commencing service delivery for optimizing care and fostering alignment with pre-existing health systems [18, 22, 24, 27]. Utilizing local methods for information dissemination proved beneficial in achieving this last objective as well [18, 26, 27]. Implementing robust health information systems, developed with the participation of the healthcare providers [24] and tailored to conflict settings real-time systematic data collection and analysis, incorporating a recommended minimum data set [18, 24, 26] and a monitoring system with integrated quality indicators [21] and improvement actions [17, 20, 22, 27], were proposed as core elements by the records analyzed.

Clear responsibilities for data collection and the use of secure transmission methods with electronic completion [21] were also highlighted as essential components within this comprehensive approach for medical planning and operations [26]. Strong disaster planning [18], constant tactical reassessment of circumstance [19, 27], prioritizing context-based

interventions [22, 27], could contribute to a resilient system. Finally, a frequent requirement supporting the goal to anticipate and mitigate conflict-related risks was to collect and disseminate information regarding the attacks on medical personnel [18, 26].

Logistics

Almost all the records highlighted that the logistical challenges across all levels of care extend from shortages of medical supplies [17, 20–24, 26, 27], to insufficient supply of blood products [24]. Difficulties in accessing humanitarian facilities contributed to the complexity of medical care delivery [20, 22, 26]. The volatile security context including attacks on healthcare facilities [19, 20, 22, 26, 27], the positioning of humanitarian medical personnel close to the continuously changing front lines [20, 22, 24, 26] highlight issues related to the safety of patients and humanitarian personnel [26] and pose a constant threat to the respect of the humanitarian principles of neutrality and independence [20, 23, 24].

Standardization and guidance for team deployment [27] and for sustaining the necessary resources [25, 26] both human and material, as well as investment in hiring or training of monitoring and evaluation specialists [18, 22, 24, 27] contributed to high quality of trauma care services.

Population safeguards, including early warning systems and egress assistance [26] together with mental health and psychological support within the existing services [21, 27], could enhance the safety of both patients and healthcare providers. Political and legislative support [18, 20, 24] by the local government and community, together with the strategic placement of infrastructure and equipment near areas where casualties are likely to occur [17, 19, 27] were underlined as essential requirements.

Finance and administration

Three records pinpointed issues related to partners' financial capacities [19], delays in orders and shipments due to customs requiring multiple government approvals [20, 22, 24], and constraints in post-operative rehabilitative care [22] due to financial concerns. Furthermore, donors' political agendas [20] as well as donor fatigue [24], were reported to influence access and intervention delivery [26], leading to restrictions on the types of funded care. Additionally, the impact of budget limitations [20] on the timeliness of setting up field hospitals, interfered with the ability to provide urgently needed services.

The interplay of factors including donor engagement [20], resource availability [24–27], pooled funds [22, 24, 25], and political backing [22], collectively shape the critical financial and administrative landscape of trauma care in conflict settings. A record, deemed practical to suggest a country-based pooled funds, managed by the United Nations (UN) Office for the Coordination of Humanitarian Affairs (OCHA) for ensuring the prioritization of resources for attaining the financial resilience of the system [21].

Discussion

Trauma systems have consistently proven effective in reducing preventable death and disability in both military and civilian contexts. However, their success depends on the adaptability to the complex and unique nature of conflict environments, which inherently prevents a one-size-fits-all solution [6, 7].

While striving to define cost-effective, feasible, and acceptable minimum standards applicable virtually worldwide, this review highlights several pressing challenges. These include the imperative for robust coordination, patient referral systems, comprehensive patients' data collection. Ensuring the safety of all actors operating in conflict zones, addressing financial and budget management issues, and clearly delineating roles and responsibilities for trauma actors is fundamental. Concurrently, the proposed solutions, and the suggested requirements must be analyzed on the merits of their replicability across different contexts.

The records analyzed underline the importance of a multidimensional approach to coordination, emphasizing the interconnectedness of resources, expertise, and efforts among humanitarian organizations [28]. This approach strengthens system resilience by reducing duplication and maximizes impact by improving resource allocation and transparency [29]. It promotes complementarity allowing scarce resources to be used more effectively to address specific needs, reaching more people [30]. Effective coordination, through national and regional structures, task forces, and trauma working groups, clarifies roles and ensures greater accountability [28, 31, 32]. Regular coordination meetings, negotiations with local authorities, and liaison with relevant government sectors are essential for establishing effective governance structures. However, remote management without local counterparts, limits accountability and monitoring, impacting intervention quality assessment and data validity [33]. Coordination without strong leadership has historically hindered inclusion, underscoring the absence of an intersectional lens across current humanitarian approaches [34]. Leadership in complex settings enhances decision-making, inspires collaboration, and supports effective trauma care [35]. Building inclusive networks and strengthening partnerships through clearly

identified official communication channels helps unify efforts and offers a strategic vision mitigating the risk of response fragmentation [28, 29, 31, 34].

A major challenge in trauma care delivery is patient referral, involving a tiered system from frontline stabilization points to field and referral hospitals, establishing thus a trauma care pathway for civilians. However, many conflict-affected countries lack a prehospital trauma care system [36]. Expanding medical transport availability, training healthcare professionals, and preemptive contingency planning for mass casualty events is crucial [37]. Furthermore, we would advocate that whenever possible, pre-hospital care provided by international actors should be integrated into a country's existing transportation and dispatch infrastructures [17, 18].

Beyond the logistics of care delivery, social and cultural barriers can worsen disability, highlighting the need to strengthen the "back end" of trauma care; mental health and rehabilitation [38, 39]. Rehabilitation professionals play a key role in early access to services, discharge planning, and linking patients to local follow-up care, thereby aiding patient flow and community reintegration [40–42]. Incorporating mental health into follow-up care reflects a holistic trauma care approach, recognizing the need for lifelong support in some cases and ensuring comprehensive care beyond the immediate response phase [42, 43].

To address expertise gaps identified in this review, we recommend appointing a coordinating entity to oversee education needs assessments, develop and provide training programs for all medical personnel in conflict zones [44]. These programs should include standardized materials and pre-deployment checklists tailored to armed conflict settings, to be completed by all personnel before deployment [45–47], but in tandem, to promote retainment of cognitive knowledge and skills, it's crucial to encourage ongoing education for all practitioners [48]. Additionally, leveraging telemedicine and mass media for widespread first aid training of community members, who often act as first responders in resource-limited settings, could push a step forward in reducing mortality and disability [49, 50].

Advances in information technology associated with data protection and safeguarding personal data, hold the potential to enhance the efficiency of humanitarian coordination, assessment, and response efforts [51]. Utilizing advanced encryption technologies within communication platforms prevents unauthorized access and mitigate the threat of data breaches, ensuring the safe transmission and storage of sensitive information [51]. Cybersecurity training and capacity-building initiatives are essential to help organizations identify and mitigate risks effectively [51]. Another tactic could entail developing decentralized data storage systems, dispersing data across a network of nodes rather than centralizing it, thereby enhancing data security and resilience against tampering or manipulation while empowering individuals to control their personal information, fostering greater trust in data management practices.[51]. Moreover, even though the introduction of electronically filled forms addressed partially data collection challenges, it can exacerbate the exclusion of vulnerable groups due to opaque consent processes and unequal power dynamics between aid providers and affected populations [52, 53]. Implementing these data protection strategies, alongside minimizing decolonization bias, could increase trust in humanitarian efforts, safeguarding patients and aid workers in conflict zones [34, 52, 53].

Adopting a standardized system for patient data collection, analysis, and communication through a uniform trauma registry with embedded quality improvement and broader public health capabilities offers on-scene real-time clinical guidance for frontline providers [28, 54, 55]. Formal protocols that rationalize community resources and rationalize ambulance use are crucial for avoiding transportation bottlenecks in the pre-hospital trauma care [29]. Rationalizing the use of ambulances, avoiding transportation bottlenecks, is essential for pre-hospital trauma care to be effective [29]. Strengthening health system preparedness and disaster response capacity is essential for effective data collection [28, 56].

Sustainability of interventions relies on understanding the local context, including health needs and security conditions, as they are essential for effective, targeted efforts [28, 32, 39] Continuous reassessment of intervention availability, quality, and coverage requires real-time data collection, analysis, and communication, including performance indicators [43].

Another factor that severely limits the scalability and sustainability of trauma care is inadequate funding or poor budget management since it bears consequences to medical supplies, healthcare training, and infrastructure. While maintaining emergency funds and dedicated budgets benefits affluent countries [57], this poses a challenge for low-income nations [58]. Joint prospective analyses, rather than retrospective annual reviews, can help bridge the humanitarian-development gap promoting self-reliance among vulnerable populations [59]. To ensure continuous funding, expanding the resource base to the private sector has been explored [32], but it raises founded concerns that vertical donations could compromise standards [60, 61]. Following the principles of the Grand Bargain 2.0, we believe increased transparency, donor accountability, and cost-effective

aid models, including the use of cash, could offer a more sustainable approach to trauma care in conflict zones [38, 62, 63].

Humanitarian agencies are increasingly vulnerable to violence, with attacks on healthcare ranging from psychosocial threats and intimidation to violence with heavy weapons becoming more frequent [64, 65]. The cases of Ukraine and Gaza are only the most recent sad examples of how targeting functioning health care infrastructure and workers on systematic basis, in complete disrespect for IHL, can spiral costs and create logistical obstacles, thus making access to essential services even more challenging for growing numbers of civilians [9, 10, 51, 52]. Documenting and reporting such violations could hold perpetrators accountable and consolidate security management [65–67].

A last question raised was the roles and responsibilities in frontline care, which according to the Geneva Conventions lies with the warring parties [4, 5, 8]. Attempts to reconcile the imperatives of security and medical intervention have proven controversial since co-locating humanitarian organizations with combatant forces, despite its attraction, challenges the humanitarian principles of neutrality and independence [68, 69], presenting humanitarian aid as another tool in the toolbox of conflict management [4, 8, 70]. In Mosul for example, the willingness of the UN and humanitarian non-governmental organizations (NGOs) to fill the void created by the irresponsibility of the conflicting parties set a worrisome precedent where militaries may feel more comfortable outsourcing their responsibilities elsewhere [69, 71, 72]. While navigating the complex issue of how to provide care when non-State and State warring parties will not, an approach pushing for greater localization includes the analysis of the crisis-affected community members' perspectives of armed actors. According to a recent study, the general approach taken by international public health experts towards the different armed actors, alienated local populations, since what was of primary relevance for them was the function of armed actors' roles in the context rather than the level of conflict [73]. We believe that the most appropriate strategy dictating the relationship between the armed and the humanitarian actors to a given conflict would promote the use of rigorous social science data collection with the use of standardized frameworks for their analysis and interpretation. Additionally, it should incorporate safeguards for easy access to the public and application of fundamental humanitarian principles, as outlined in the Sphere Handbook [74].

In this context, addressing health needs alone without creating a peace-building framework results insufficient [75, 76]. Aid should be based on rights as well as needs and at times humanitarianism must dovetail with political advocacy and conflict resolution, prioritizing the principle of humanity over any other, without ever abandoning the rest [77]. Where development and humanitarianism coincide, concerns arise about the impartiality and effectiveness of health interventions, often overshadowed by the political narrative of health for state-building. This narrative risks favoring support regardless of the states' partisan role in a conflict, overlooking their potential involvement in violence or their commitment to population welfare [78]. Despite limited evidence on the benefits of health for state-building [79–81] it remains a noble objective for refusal to engage may neglect how state stability can help address post-conflict vulnerable populations' needs. We would argue that even though a continuous debate on strategies of anticipating and monitoring the negative effects of state-building approaches on health interventions is crucial, the focus must remain on direct health and humanitarian outcomes for populations during the conflict-affected populations, as well as on how to preserve these within a wider policy agenda of building stable and resilient health systems. Investigating barriers and levers to government engagement with the national, regional, and humanitarian aid network could help standardize local community inclusion and thus could better align humanitarian healthcare interventions with the local health priorities [32, 82].

Over the past decade, trauma care provision during conflicts capacities have shifted toward national and regional efforts, seeing humanitarian actors closer to the frontline, which poses the need to anticipate, prepare for, and respond to conflicts addressing needs and priorities. Lessons learned from warzone humanitarian medical aid missions can improve preparedness for future crises and potentially facilitate the transition from traditional relief-centered approaches to more comprehensive and sustainable strategies [83, 84].

Strengths and limitations

Even though only one article was excluded due to the language criterion, it's possible that pertinent research in other languages was missed. Furthermore, reports not explicitly using terms related to trauma care terms could also have been overlooked, although reports using broader terms like "injury" were expected to be included in our search. At last, despite the WHO framework's limitations-such as its limited applicability to the complexities of conflict, the overemphasis of public health perspectives, neglect of contextual factors, and lack of flexibility-we adopted it for our analysis for its structure, methodological rigor and international

recognition facilitates knowledge exchange and collaboration.

Conclusions

Through the systems' lens, our review underscored the multifaceted challenges and analyzed some of the potential solutions essential for the effective implementation of trauma care systems by humanitarian actors in conflict zones. These encompass the need for a multidimensional approach to coordination, clear delineation of roles between organizations, strong leadership, and inclusive partnerships. Ensuring robust medical transport and healthcare professional training, alongside preemptive contingency planning for mass casualty events, are vital aspects. The development of standardized educational materials, telemedicine utilization, and continuous reassessment of local contexts are also critical. Advancements in information technology, data protection, and standardized data collection methods are emphasized, alongside the importance of transparency, accountability, and documentation of attacks on medical personnel. Ultimately, the broader objectives of advocacy, conflict resolution, and peace building must align with the localization of aid, underscoring the complex interplay between humanitarian action and broader geopolitical dynamics.

We believe that this synthesis enhances the collective understanding of trauma systems, providing a valuable foundation to inform policy, practice, and future research efforts. To build on these findings, future research should prioritize examining how the identified challenges have been practically addressed and resolved, drawing on the tangible experiences of humanitarian personnel involved in trauma care delivery. Additionally, a historical review of the literature could further shed light to the commonalities and divergences in trauma care provision across various conflict contexts, offering critical insights to guide the development of adaptable and context-sensitive strategies. Together, these efforts ultimately aim to enable more effective, equitable, accountable, and sustainable interventions that alleviate the suffering of civilian populations affected by trauma amidst the ravages of war.

Abbreviations

IHL	International Humanitarian Law
WHO	World Health Organization
PHEOC	Public Health Emergency Operations Centre
UN	United Nations
OCHA	Office for the Coordination of Humanitarian Affairs
NGOs	Non-Governmental Organizations
QuADS	Quality Assessment with Diverse Studies
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s13031-025-00643-7.

Additional file 1.

Additional file 2.

Additional file 3.

Acknowledgements

The main author wants to acknowledge Clara Del Prete, George Teo Voicescu, Giulia Facci, José García Ulerio, Martina Valente, and Paolo Malerba for their valuable support throughout the framework identification. This manuscript is the result of a study conducted in the framework of the International PhD in Global Health, Humanitarian Aid and Disaster Medicine, organized by Università del Piemonte Orientale (UPO).

Author contributions

NMP, LR, and HL conceptualized the research objectives. NMP and HL defined the search strategy. NMP ran the search. NMP and HL screened titles and abstracts and consequently full texts. NMP drafted the whole manuscript. LR, CT, FS, FBA, and HL reviewed the manuscript multiple times contributing to its content and quality. All authors provided contributions to the discussion and approved the final manuscript.

Funding

No funding was received by any of the author for this study.

Availability of data and materials

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Author details

[1]CRIMEDIM – Center for Research and Training in Disaster Medicine, Humanitarian Aid and Global Health, Università del Piemonte Orientale, 28100 Novara, Italy. [2]Department of Translational Medicine, Università del Piemonte Orientale, 28100 Novara, Italy. [3]Department for Sustainable Development and Ecological Transition, Università del Piemonte Orientale, 13100 Vercelli, Italy. [4]International Committee of the Red Cross, 19 Avenue de la Paix, 1202 Geneva, Switzerland. [5]World Health Organization, Geneva, Switzerland. [6]Department of Community Health Nursing, College of Nursing, University of Hail, Hail, Saudi Arabia.

Received: 28 September 2024 Accepted: 6 January 2025
Published online: 17 January 2025

References

1. Peden M, McGee K, Sharma G. The injury chart book: a graphical overview of the global burden of injuries. Geneva: World Health Organization; 2002.
2. World Health Organization - Eastern Mediterranean Region. Addressing the increasing burden of trauma in humanitarian settings, https://www.emro.who.int/media/news/addressing-the-increasing-burden-of-trauma-in-humanitarian-settings.html. Accessed 14 Dec 2024.

3. Charlson F, van Ommeren M, Flaxman A, et al. New WHO prevalence estimates of mental disorders in conflict settings: a systematic review and meta-analysis. Lancet. 2019;394:240–8.
4. Médecins Sans Frontières. War And Conflict, https://www.msf.org/war-and-conflict. Accessed 8 Feb 2024.
5. Murray CJL, King G, Lopez AD, et al. Armed conflict as a public health problem. BMJ. 2002;324:346–9.
6. MacKenzie EJ, Rivara FP, Jurkovich GJ, et al. A national evaluation of the effect of trauma-center care on mortality. N Engl J Med. 2006;354:366–78.
7. Eastridge BJ, Wade CE, Spott MA, et al. Utilizing a trauma systems approach to benchmark and improve combat casualty care. J Trauma Injury Infect Crit Care. 2010;69:S5–9.
8. International Committee of the Red Cross. War & Law, https://www.icrc.org/en/war-and-law%E2%80%8B. Accessed 8 Feb 2024.
9. Vassallo DJ. The international red cross and red crescent movement and lessons from its experience of war surgery. J R Army Med Corps. 1994;140:146–54.
10. Wong EG, Dominguez L, Trelles M, et al. Operative trauma in low-resource settings: The experience of Médecins Sans Frontières in environments of conflict, postconflict, and disaster. Surgery. 2015;157:850–6.
11. Peters MDJ, Marnie C, Tricco AC, et al. Updated methodological guidance for the conduct of scoping reviews. JBI Evid Synth. 2020;18:2119–26.
12. Tricco AC, Lillie E, Zarin W, et al. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. Ann Intern Med. 2018;169:467–73.
13. Ouzzani M, Hammady H, Fedorowicz Z, Elmagarmid A. Rayyan—a web and mobile app for systematic reviews. Syst Rev. 2016. https://doi.org/10.1186/s13643-016-0384-4.
14. Harrison R, Jones B, Gardner P, et al. Quality assessment with diverse studies (QuADS): an appraisal tool for methodological and reporting quality in systematic reviews of mixed- or multi-method studies. BMC Health Serv Res. 2021;21:144.
15. Thompson J. A Guide to abductive thematic analysis. The Qualitative Report. Epub ahead of print 20 May 2022. https://doi.org/10.46743/2160-3715/2022.5340.
16. World Health Organization. Framework for a Public Health Emergency Operations Centre. 2015.
17. Mock C, Lormand JD, Goosen J, et al. Guidelines for essential trauma care. World Health Organization, 2004.
18. Sasser S, Varghese M, Kellermann A, et al. Prehospital Trauma Care Systems. World Health Organization, 2005.
19. Giannou C, Baldan M. War Surgery - Working With Limited Resources In Armed Conflict And Other Situations Of Violence. Second. International Committee of the Red Cross, 2019.
20. Spiegel P, Wise P, Kushner AL, et al. The mosul trauma response a case study. February 2018.
21. World Health Organization. A One-Year Review of Trauma Data and the Humanitarian Consequences. Emergency Trauma Response to the Gaza Mass Demonstrations 2018–2019. 2019.
22. Akik C, Semaan A, Shaker-Berbari L, et al. Responding to health needs of women, children and adolescents within Syria during conflict: intervention coverage, challenges and adaptations. Confl Health. 2020;14:37.
23. Quinn VJM, Amouri OF, Reed P. Notes from a field hospital south of Mosul. Global Health. 2018;14:27.
24. Garber K, Kushner AL, Wren SM, et al. Applying trauma systems concepts to humanitarian battlefield care: a qualitative analysis of the Mosul trauma pathway. Confl Health. 2020;14:5.
25. Khudadad U, Aftab W, Ali A, et al. Perception of the healthcare professionals towards the current trauma and emergency care system in Kabul, Afghanistan: a mixed method study. BMC Health Serv Res. 2020;20:991.
26. Wren SM, Wild HB, Gurney J, et al. A consensus framework for the humanitarian surgical response to armed conflict in 21st century Warfare. JAMA Surg. 2020;155:114–21.
27. Salio F, Pirisi A, Ciottone GR, et al. Applying the haddon matrix to frontline care preparedness and response in asymmetric warfare. Prehosp Disaster Med. 2022;37:577–83.
28. World Health Organization. Emergency medical team coordination cell coordination handbook. 2021.
29. Berwick D, Downey A, Cornett E. A national trauma care system: integrating military and civilian trauma systems to achieve zero preventable deaths after injury. Washington, D.C: National Academies Press; 2016.
30. Office for the Coordination of Humanitarian Affairs. Coordination To Save Lives: History and Emerging Challenges. 2012.
31. World Health Organization. Health Cluster Guide. A practical handbook. 2020.
32. Pusterla F, Pusterla EIR. The future of humanitarian aid in a new context full of challenges, https://www.europarl.europa.eu/RegData/etudes/STUD/2021/653651/EXPO_STU(2021)653651_EN.pdf. Accessed 9 Feb 2024.
33. Donini A, Maxwell D. From face-to-face to face-to-screen: remote management, effectiveness and accountability of humanitarian action in insecure environments. Int Rev Red Cross. 2013;95:383–413.
34. Lough O, Barbelet V, Njeri S. Inclusion and exclusion in humanitarian action: findings from a three-year study. London, https://aap-inclusion-psea.alnap.org/system/files/content/resource/files/main/Inclusion_exclusion_synthesis_YQvq77F.pdf. Accessed 9 Feb 2024.
35. Julia Steets, François Grünewald, Andrea Binder, et al. Cluster Approach Evaluation 2 Synthesis Report. April 2010.
36. Kironji AG, Hodkinson P, de Ramirez SS, et al. Identifying barriers for out of hospital emergency care in low and low-middle income countries: a systematic review. BMC Health Serv Res. 2018;18:291.
37. International Committee of the Red Cross. Ensuring the Preparedness and Security of Health-Care Facilities in Armed Conflict and Other Emergency, https://healthcareindanger.org/wp-content/uploads/2015/09/icrc-002-4239-ensuring-preparedness-security-health-care-facilities.pdf. Accessed 13 May 2024.
38. Alexander J. As the Grand Bargain gets a reboot, the limits of aid reform come into focus. The New Humanitarian, 2023, https://www.thenewhumanitarian.org/analysis/2023/06/15/grand-bargain-3-reboot-limits-aid-reform. Accessed 10 Feb 2024.
39. Roberts DL. Staying alive-safety and security guidelines for humanitarian volunteers in conflict areas. Second. Geneva: international committee of the red cross, https://www.icrc.org/en/doc/assets/files/other/icrc_002_0717.pdf. Accessed 11 Feb 2024.
40. Knowlton LM, Gosney JE, Chackungal S, et al. Consensus statements regarding the multidisciplinary care of limb amputation patients in disasters or humanitarian emergencies: report of the 2011 humanitarian action summit surgical working group on amputations following disasters or conflict. Prehosp Disaster Med. 2011;26:438–48.
41. Chackungal S, Nickerson JW, Knowlton LM, et al. Best practice guidelines on surgical response in disasters and humanitarian emergencies: report of the 2011 humanitarian action summit working group on surgical issues within the humanitarian space. Prehosp Disaster Med. 2011;26:429–37.
42. Emergency Medical teams. Minimum technical standards and recommendations for rehabilitation in emergency medical teams. World Health Organization, 2016.
43. Spiegel PB, Checchi F, Colombo S, et al. Health-care needs of people affected by conflict: future trends and changing frameworks. Lancet. 2010;375:341–5.
44. The Lancet Commission on Global Surgery. *The Lancet*, https://www.thelancet.com/commissions/global-surgery. Accessed 11 Feb 2024.
45. Anderson GA, Kayima P, Ilcisin L, et al. Development of a comprehensive trauma training curriculum for the resource-limited environment. J Surg Educ. 2018;75:1317–24.
46. Sun JH, Wallis LA. The emergency first aid responder system model: using community members to assist life-threatening emergencies in violent, developing areas of need. Emerg Med J. 2012;29:673–8.
47. Tannvik TD, Bakke HK, Wisborg T. A systematic literature review on first aid provided by laypeople to trauma victims. Acta Anaesthesiol Scand. 2012;56:1222–7.
48. World Health Organization. Transforming and scaling up health professionals' education and training, https://iris.who.int/bitstream/handle/10665/93635/9789241506502_eng.pdf?sequence=1. Accessed 13 May 2024.
49. David Nott foundation. Surgical Training for Austere Environments (STAE), https://davidnottfoundation.com/uk-course-stae/. Accessed 11 Feb 2024.

50. Mitchell R, Bue O, Nou G, et al. Validation of the Interagency Integrated Triage Tool in a resource-limited, urban emergency department in Papua New Guinea: a pilot study. Lancet Reg Health West Pac. 2021;13: 100194.
51. Kuner C, Marelli M. Handbook on Data Protection in Humanitarian Action. 2nd Edition, file:///C:/Users/nikma/Downloads/4305.01_002-ebook%20.pdf. Accessed 13 May 2024.
52. Kaurin D. Data Protection and Digital Agency for Refugees, www.cigionline.org/publications/data-protection-and-digital-agency-refugees/. Accessed 10 Feb 2024.
53. Bryant J. Digital technologies and inclusion in humanitarian response. London, https://odi.cdn.ngo/media/documents/Digital_inclusion_synthesis.pdf. Accessed 10 Feb 2024.
54. Murad MK, Larsen S, Husum H. Prehospital trauma care reduces mortality. Ten-year results from a time-cohort and trauma audit study in Iraq. Scand J Trauma Resuscit Emerg MED. 2012. https://doi.org/10.1186/1757-7241-20-13.
55. Stevens KA, Paruk F, Bachani AM, et al. Establishing hospital-based trauma registry systems: lessons from Kenya. Injury. 2013;44:S70–4.
56. Kubo T, Yanasan A, Herbosa T, et al. Health data collection before, during and after emergencies and disasters—the result of the Kobe expert meeting. Int J Environ Res Public Health. 2019;16:893.
57. The Armed Conflict Location & Event Data Project (ACLED). Conflict Index Overview, https://acleddata.com/acled-conflict-index-mid-year-update-2023/#overview. Accessed 10 May 2024.
58. European Union. rescEU, https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/resceu_en. Accessed 10 Feb 2024.
59. High-Level Panel on Humanitarian Financing Report to the Secretary-Geneva. Too important to fail—addressing the humanitarian financing gap, https://interagencystandingcommittee.org/sites/default/files/migrated/2017-02/hlp_report_too_important_to_failgcoaddressing_the_humanitarian_financing_gap.pdf. Accessed 10 Feb 2024
60. Browne S, Cordon R. Vertical Funds: Lessons for Multilateralism and the UN. 2015. https://www.futureun.org/media/archive1/briefings/FUNDS_Brief25_Jan2015_WHO_GAVI_GF.pdf. Accessed 10 Feb 2024.
61. Truppa C, Yaacoub S, Valente M, et al. Health systems resilience in fragile and conflict-affected settings: a systematic scoping review. Confl Health. 2024;18:2.
62. Inter-Agency Standing Committee. Grand Bargain 2.0 Framework. 2023.https://interagencystandingcommittee.org/sites/default/files/migrated/2021-07/%28EN%29%20Grand%20Bargain%202.0%20Framework.pdf. Accessed 10 Feb 2024.
63. Inter-Agency Standing Committee (IASC). Launch of the Caucus on Scaling up Anticipatory Action. 2024. https://interagencystandingcommittee.org/grand-bargain-official-website/launch-caucus-scaling-anticipatory-action-0. Accessed 7 May 2024.
64. World Health Organization. Prevention and protection against attacks on health care: good practices. Geneva: WHO, https://iris.who.int/bitstream/handle/10665/375802/9789240019461-eng.pdf?sequence=1. Accessed 11 Feb 2024.
65. De Vos C, Gallina A, Kovtoniuk P, et al. Destruction and Devastation: One Year of Russia's Assault on Ukraine's Health Care System. 2024. https://phr.org/our-work/resources/russias-assault-on-ukraines-health-care-system/. Accessed 11 Feb 2024.
66. Sean Casey, World Health Organization. On the health situation in Gaza - Press Conference. 2024. https://webtv.un.org/en/asset/k17/k17naympkg. Accessed 8 Feb 2024.
67. Sen K, Al-Faisal W, AlSaleh Y. Syria: effects of conflict and sanctions on public health. J Public Health. 2013;35:195–9.
68. Barry J, Jefferys A. A bridge too far: Aid agencies and the military in humanitarian response. 2002.
69. Lancet T. Examining humanitarian principles in changing warfare. The Lancet. 2018;391:631.
70. Bouchet-Saulnier F. The practical guide to humanitarian law. Third. Rowman & Littlefield; 2013.
71. Hawkins V, Pérache AH. Humanitarian medicine is more than a technical exercise. The Lancet. 2017;390:2226–8.
72. Fouad FM, Sparrow A, Tarakji A, et al. Health workers and the weaponisation of health care in Syria: a preliminary inquiry for The Lancet –American University of Beirut Commission on Syria. The Lancet. 2017;390:2516–26.
73. Boland ST, Nylen A, Bates M, et al. Armed actor interventions in humanitarian and public health crises: examining perspectives of crisis-affected community members. Confl Health. 2024;18:33.
74. Sphere Project. Sphere Handbook: Humanitarian Charter and Minimum Standards in Disaster Response, 2011. https://www.refworld.org/reference/manuals/sphere/2011/en/92158. Accessed 7 May 2024.
75. Barnett M, Weiss TG. Humanitarianism in question: Politics, power, ethics. Peace keeping and the Peace kept. Cornell university Press, 9780801465086. 2012. Accessed 11 Feb 2024.
76. Macrae J, Leader N. Apples, pears and porridge: the origins and impact of the search for 'coherence' between humanitarian and political responses to chronic political emergencies. Disasters. 2001;25:290–307.
77. Weiss TG. Principles, politics, and humanitarian action. Ethics Int Aff. 1999;13:1–22.
78. Speech by Nick Grono to Institut Royal Supérieur de Défense. Fragile states inflict untold misery on their citizens and on neighboring countries. Brussels. 2010. https://www.crisisgroup.org/global/fragile-states-and-conflict. Accessed 7 May 2024.
79. Sondorp E, Scheewe S. Health systems strengthening and conflict transformation in fragile states. Amsterdam. 2012. https://coregroup.org/wp-content/uploads/2020/02/expert-meeting-report-mmi-2012-30-11-2012.pdf. Accessed 7 May 2024.
80. Stigant S, Murray E. National Dialogues: A Tool for Conflict Transformation? 2015. https://www.usip.org/publications/2015/10/national-dialogues-tool-conflict-transformation. Accessed 7 May 2024.
81. Philips M, Derderian K. Health in the service of state-building in fragile and conflict affected contexts: an additional challenge in the medical-humanitarian environment. Confl Health. 2015;9:13.
82. The Commission to the European Parliament and The Coucil. *EU's humanitarian action: new challenges, same principles*. Brussels, 2021. https://ec.europa.eu/echo/files/aid/hacommunication2021.pdf. Accessed 10 Feb 2024.
83. Ran van der Wal. Humanitarian intervention in a changing world: need for a new model of care. 2015; https://journals.openedition.org/humanitaire/3256. Accessed 11 Feb 2024.
84. Sommaruga C. Humanity: our priority now and always. Ethics Int Aff. 1999;13:23–8.

Publisher's Note